

Executive Summary

ES.1 Introduction

This document, *Klamath Facilities Removal Environmental Impact Statement/ Environmental Impact Report* (EIS/EIR), has been developed in accordance with the requirements of the National Environmental Policy Act (NEPA) and the California Environmental Quality Act (CEQA) to analyze the potential impacts to the environment from removing four PacifiCorp Dams (J.C. Boyle, Copco 1, Copco 2, and Iron Gate) on the Klamath River under the Klamath Hydroelectric Settlement Agreement (KHSa). The KHSa is one part of a basin-wide approach to address the continuing and unresolved issues related to the basin resources that have resulted from over-stressed water supplies and water quality concerns.

Due to these unresolved issues, during the previous ten years, the federal government has faced events and taken unprecedented and extraordinary actions in the Klamath Basin. The following are examples of some of these events and actions:

- In spring of 2001, the federal government announced there would be no deliveries of water from Upper Klamath Lake or Klamath River to Reclamation's Klamath Project due to Federal Endangered Species Act (ESA) concerns - the first time project water deliveries were not made at a Reclamation project (very limited deliveries occurred later in the summer).
- In 2002, there was a major fish die-off in the Klamath River of adult fall-run Chinook salmon (at least 30,000 fish).
- In 2005, warnings of contact with water in Iron Gate and Copco Reservoirs due to toxic algae blooms began being posted annually.
- In 2006, low abundance of Klamath Basin Chinook salmon led to severe restrictions on commercial and recreational harvest along 700 miles of the California and Oregon coast, as well as major reductions in Klamath River recreational and tribal fisheries.
- In 2009, Klamath area commercial salmon harvest was closed.
- In 2010, there was a significant reduction in water deliveries to Reclamation's Klamath Project due to dry hydrologic conditions.
- In 2010, the Klamath Tribes limited their harvest of suckers to ceremonial use for the 25th consecutive year and experienced their 92nd year without access to salmon.

These events and actions, plus others not mentioned, have demonstrated the need for long-term solutions that address these complex and basin-wide issues. There have been limited and piecemeal approaches that have provided interim relief or some mitigation, but the Klamath Basin faces substantial, long-term challenges that many believe call for different and more comprehensive approaches. As stated above, the KHSa is one part of a proposed approach to resolve these issues.

KHSA

The KHSA is an agreement to study the potential removal of four dams on the Klamath River and, should a decision be made to remove these dams, the agreement provides a path forward on undertaking this removal. The potential removal of dams can be one of, or a part of, other long-term solutions to basin challenges. The KHSA was developed by representatives of 45 organizations including federal agencies, the States of California and Oregon, PacifiCorp, Indian Tribes, counties, irrigators, and conservation and fishing groups in order to end one of the most economically, environmentally, and culturally devastating water disputes in the western United States. The terms of the KHSA acknowledge, however, that there are many unknown consequences regarding the potential removal of these facilities and thus the agreement requires that the Secretary of the Interior undertake a series of scientific studies to determine whether dam removal would be in the public interest and would advance restoration of the salmon fishery. If the Secretary, in cooperation with the Secretary of Commerce and other Federal agencies as appropriate, determines that dam removal fulfills these criteria, the States of Oregon and California will consider whether to concur in that determination.¹ If the governors concur, dam removal will proceed in accordance with the KHSA. This joint EIS/EIR is intended to provide the required environmental review for both the Secretarial Determination and the gubernatorial concurrences. Consequently, this EIS/EIR has been prepared by the United States Department of the Interior (DOI), as lead NEPA agency, and the California Department of Fish and Game (CDFG), as lead CEQA agency (collectively referred to herein as Lead Agencies). Recognizing that elements of the Proposed Action would occur in California and Oregon, CDFG collaborated with DOI, with input from the State of Oregon, to make a reasonable, good faith effort in disclosing all significant environmental effects of the Proposed Action. Absent certain circumstances, CEQA does not apply to any project or portion thereof located outside of California which will be subject to environmental review pursuant to NEPA. (Public Resources Code § 21080(b)(14); CEQA Guidelines § 15277).

Klamath Basin Restoration Agreement (KBRA)

The KBRA is also a basin-wide approach to addressing the current resources challenges. The KBRA will be signed by the United States upon congressional authorization.² The complete KBRA package entails various commitments and actions that have been or will be proposed and/or undertaken in the basin by federal, state, local, tribal, and private interests. Some of the KBRA actions could have effects (whether adverse or beneficial) on the same environmental resources that would be affected by dam removal. Some KBRA actions are expressly preconditioned by and therefore hinge upon dam removal, and an affirmative Secretarial Determination. Some KBRA actions are federal but are not expressly linked to dam removal, and some actions are completely between private parties.

¹ There are certain conditions that must be met prior to the Secretary making this determination. One such condition is the enactment of federal law authorizing the KHSA which has not occurred as of this time. There are also other requirements. For a complete list of these requirements, please see KlamathRestoration.gov, which has the KHSA posted in its entirety.

² Under the KHSA and KBRA (Agreements) the United States will be a party to the KBRA at the time of a Secretarial Determination under the KHSA, and obligated to implement the KBRA according to its terms.

NEPA Specific Analysis

The federal lead agency, the DOI, is analyzing the KBRA as a connected action. NEPA defines connected actions as those actions that are closely related or cannot or will not proceed unless other actions are taken previously or simultaneously (40 CFR 1508.25(a)(1)(ii)).³ Some actions or component elements of the KBRA are independent obligations and thus have independent utility from the KHSA, but the implementation of several significant elements of the KBRA package would be different, if the determination under the KHSA is not to pursue full dam removal. Recognizing that implementation of many elements of the KBRA are unknown and not reasonably foreseeable at this time, the connected action analysis is being undertaken at a programmatic level. Consequently, appropriate NEPA compliance will be completed for the KBRA in the future.

For purposes of this analysis, the KBRA is viewed as a whole program even though some of its component parts are currently being implemented (those without a federal nexus or not subject to environmental review) or could be implemented on an individual basis without dam removal. One of the reasons the KBRA is treated as a whole for purposes of this analysis under NEPA is that the individual activities under the KBRA will be implemented, through adaptive management and in close coordination with committees comprised of stakeholders, in a manner that seeks to attain synergy and optimize benefits through a coordinated, holistic approach to restoration and water management. Implementing those KBRA activities that are not connected to facilities removal on an individual basis without the benefit of adaptive management and stakeholder input will likely not provide the same level of optimization.

Consequently, for purposes of NEPA, in the EIS for alternatives where dams are not removed, the KBRA, as currently signed by the parties, would not be implemented. This is not a judgment about whether any particular measure in the KBRA will be implemented in the absence of dam removal. Rather, it is an assumption that in the absence of dam removal, the KBRA will not include all of the components present in their current form. This

NHPA Section 106 Process

DOI elected to utilize the NEPA process to meet the federal requirements of Section 106 of the National Historic Preservation Act (NHPA) as allowed under 36 CFR Section 800.8(c). DOI defines the undertaking, for purposes of Section 106 of the NHPA, as the removal of the four PacifiCorp dams which may be a result of the Secretarial Determination. The proposed undertaking has the potential to affect historic properties triggering compliance with Section 106 of the NHPA. The analysis and consultations concerning any effects of the Proposed Action and alternatives on historic properties are integrated into the NEPA review and documentation pursuant to the criteria identified in 36 CFR Section 800.8(c)(1)-(4).

³ We acknowledge, however, that the KBRA could also be analyzed as a cumulative or similar action under 40 CFR 1508.25(a)(2) and (3). We note that all three definitions (connected action, cumulative actions, and similar actions) are within the section that provides parameters for the "scope" of the action, which determines both the range of alternatives and the impacts to be considered in an EIS. Ultimately, however, we believe the important point is not the labeling but the analysis and whether the decision (in this case whether to remove four dams) is informed by a EIS that is proper in scope.

means that this document does not make decisions about implementing any specific program, plan, commitment, or activity under the KBRA if dams are not removed. Federal decisions on specific measures in the KBRA, including any necessary additional environmental review, will be made in a separate process. This document will be used to inform a decision related only to dam removal. In doing so, NEPA requires that we properly scope the EIS to include a discussion of connected actions. Further NEPA Section 40 CFR 1508.25 recognizes the interrelationship of scope to other statements and encourages to tier EISs, focusing on issues as they are ripe for decision.

CEQA Specific Analysis

CDFG, as lead agency under CEQA, is analyzing relevant parts of the KBRA in a programmatic fashion, as described in Section 15168 of the CEQA Guidelines. This decision was made because many of KBRA's component elements have not been specified to a degree where the associated impacts would be reasonably foreseeable for purposes of this environmental analysis. The parties recognize that future project-specific analysis may be required for various components of the KBRA as they become more clearly defined and when a public entity, as defined by CEQA Guidelines section 15379, identifies a discretionary approval pursuant to CEQA Guidelines section 15378 which would obligate subsequent review. A program-level document is appropriate when a project consists of a series of smaller projects or phases that may be implemented separately. Under the programmatic EIR approach, future projects or phases may require additional, project-specific environmental analysis. It should also be noted that this EIR makes certain assumptions about the foreseeable effects of KBRA based on existing information, including, among other things, how the fishery and water resources programs may be designed and implemented. CDFG recognizes that subsequent environmental analysis may be required by any California public entity with an approval or permitting obligation if the circumstances specified by CEQA Guidelines section 15162(a) are triggered.

Importantly, CDFG could have analyzed the associated impacts of the KBRA relative to the KHSAs in the indirect and cumulative impacts analysis portion of the KHSAs EIR as it is not affirmatively approving or carrying out any one aspect of the KBRA that would be subject to environmental review. CDFG recognizes it is not “approving” any discretionary portion of the KBRA that could alter the physical environment and that by signing the KBRA it has already executed and committed to the agreement itself. Thus, similarly to the EIS, there are no alternatives that consider what a new or revised KBRA might look in the event dams are not removed. Rather, to avoid confusion, duplication, and wasted resources, CDFG has determined that the concurrent and connected nature of the KBRA to the KHSAs warrants a clear understanding of its potentially significant impacts and that the approach of programmatic analysis is equally, if not more, sufficient for providing that information to decision-makers.

Thus, out of an abundance of caution, and to ensure full transparency, CDFG has agreed to consider significance determinations for the KBRA in a programmatic fashion. Recognizing that elements of the Proposed Action would occur in California and Oregon, CDFG collaborated with DOI to, with input from the State of Oregon, make a reasonable, good faith effort in disclosing all significant environmental effects of the Proposed Action. Absent certain circumstances, CEQA does not apply to any project or portion thereof located outside of California which will

be subject to environmental review pursuant to NEPA. (Public Resources Code § 21080(b)(14); CEQA Guidelines § 15277). CDFG considers the proposed actions by California to be implementation of the KHSR and thus has crafted alternatives only for dam removal itself, assuming that absent full facilities removal the relevant elements of the KBRA will no longer be ascertainable.. CDFG recognizes that in the event subsequent analysis is deemed appropriate, it will be required to consider any feasible alternatives, mitigation measures, and any other elements required by CEQA as the basis for any approval of such KBRA project or phase in accordance with existing law.

Oregon Concurrence

The State of Oregon, and more specifically the “Klamath Team” consisting of Oregon Water Resources, Oregon Department of Fish and Wildlife, and Oregon Department of Environmental Quality, will follow a distinct process for determining concurrence with an Affirmative Determination by the Secretary of Interior (as defined pursuant to Executive Order No. 10-10 by the Governor of Oregon).

The Oregon Klamath Team will evaluate two questions in order to determine concurrence:

1. Whether significant impacts identified in its environmental review can be avoided or mitigated as provided under state law.
2. Whether the facilities removal will be completed within the State Cost Cap.

The Klamath Team will provide the results of its evaluation in a recommendation to the Governor, for transmittal to the Secretary of Interior as a concurrence, if appropriate.

ES.2 Background

Figure ES-1 illustrates many of the existing features of the Klamath Basin in southern Oregon and northern California. The Klamath Basin’s history, like numerous other river basins throughout the western United States, is one of fish harvest, dam construction, water diversion, and corresponding changes in the basin’s water quality, hydrology, and natural resources.



Figure ES-1. The Klamath Basin

ES.2.1 Basin Timeline

Figure ES-2 displays a timeline of some of the events and activities within the basin which have contributed to current conditions related to water supply, fisheries, and stakeholder negotiations. Water diversions and planning for dam construction in the basin began prior to 1905, when the precursor to the Bureau of Reclamation (Reclamation) started construction of Reclamation's Klamath Project. Construction of the Klamath Hydroelectric Project, starting with Copco 1 Dam, began in 1911.

ES.2.2 Activities Leading to the Development of the KHSR and the KBRA

While the construction and operation of reservoirs and dams on the Klamath River facilitated development, growth, and expansion of an agricultural economy in the region, it also contributed to declines in fisheries and water quality, as well as impacts on tribal resources and culture.

As described above, construction of the dams along the mainstem of the Klamath River resulted in fisheries declines. The construction of Copco 1 Dam resulted in decimation of the Klamath Tribes' anadromous fisheries by blocking fish passage to the Upper Basin. The 1980s and 1990s witnessed declining populations and closure of Lost River and shortnose sucker fisheries as well as the federal listing under the Endangered Species Act of both sucker species and coho salmon.

Klamath Hydroelectric Project

The Klamath Hydroelectric Project was constructed between 1911 and 1962 and includes eight developments: the East and West Side power facilities, and Keno, J.C. Boyle, Copco 1, Copco 2, Fall Creek, and Iron Gate Dams. Located at the upstream boundary of the Klamath Hydroelectric Project, Link River Dam and Upper Klamath Lake are not part of the project.

All of the dams, excluding Link River Dam, are owned by PacifiCorp. Link River Dam was constructed to enhance hydroelectric production at the East and Westside power plants as well as control the storage and timing of water releases downstream to better control future power production at the lower river dams. The dam is operated by PacifiCorp under Reclamation's direction for regulating flows and storing water in Upper Klamath Lake.

Keno Dam regulates water levels of the Klamath River upstream of the dam. The facility does not include power-generating equipment. PacifiCorp operates the dam under an agreement with Reclamation to maintain stable water levels in Keno Reservoir for consistent water delivery to dependent water users.

The dams on the mainstem of the Klamath River include: J.C. Boyle, Copco 1, Copco 2, and Iron Gate Dams (the Four Facilities), which are currently owned by PacifiCorp. The portion of the Klamath River that includes these four most downstream dams is referred to as the Klamath Hydroelectric Reach. Fall Creek Dam is on a Klamath River tributary that flows into Iron Gate Reservoir.

The purpose of the Klamath Hydroelectric Project is power generation. The installed maximum capacity of the entire project is 169 megawatts and, on average since full installation in 1963, the project produced 82 megawatts, and annually generated 716,800 megawatt-hours of electricity.



Figure ES-2a. Klamath Basin Timeline



Figure ES-2b. Klamath Basin Timeline

In 2008 and 2010, the United States Fish and Wildlife Service (USFWS) and the National Oceanic and Atmospheric Administration (NOAA) Fisheries Service, respectively, issued biological opinions on Reclamation's Klamath Project operations to better protect listed species. Project operations are governed in part by both opinions.

Concurrently with the progression of these fish species and fisheries conditions in the basin, the water delivery curtailments described under Section ES.1, resulted in stressed natural resource availability throughout the basin. In 2006, power rates for irrigators began to climb, and Reclamation's Klamath Project irrigators faced more water shut-offs and curtailments. The likelihood that such widely traumatic cycles would continue, coupled with upcoming changes PacifiCorp would need to make in order to continue operating their hydroelectric project, led basin stakeholders and American Indian Tribes to collaborate for a mutually beneficial agreement as a sustainable option for solving the basin's problems.

While stakeholders began efforts to reach agreement on the multifaceted issues in the basin in the 1990s, the prospect of settlement increased in 2001 and 2002 following the water-related farming and fisheries crises experienced in those years. Official negotiations leading to the KHSA and KBRA began in 2005. The KHSA was an outcome of Federal Energy Regulatory Commission's (FERC) Alternative Dispute Resolution Procedures as outlined in the Energy Policy Act of 2005⁴ (18 C.F.R. 385.601, et seq.) wherein the parties elected to set aside differences to reach resolution on a settlement that is in furtherance of the interests of all of the parties. As established in Section 1.2 of the KHSA, many of the parties to the settlement maintain that facilities removal will help restore basin resources and all Signatory parties agree that settlement will help reduce conflicts among Klamath Basin communities. The draft KBRA was released in January 2008. The agreements were negotiated and written to be executed together and are referred to herein as the Klamath Settlement.

ES.2.2.1 FERC Relicensing

The KHSA and KBRA negotiation process coincided with PacifiCorp's 2004 relicensing application for the Klamath Hydroelectric Project. The company's original 1956 license expired in 2006. The 1956 PacifiCorp license pre-dated many environmental laws, and did not include prescriptions (Section 18 of the Federal Power Act (FPA) [16 USC 811]) for fish passage over or around the dams. Currently, only J.C. Boyle and Keno Dams have fish passage facilities, but these fishways do not meet current passage criteria.

⁴ Section 442 of the Energy policy Act of 2005, Pub. L. 109-58, SS 241, 119 Stat, 594, 67475 (Aug. 8, 2005) ("EPAAct") (codified in 16 U.S.C. SS 797 (e) and 811), and the underlying procedural regulations codified in 50 C.F.R. Part 221.

The dams have been operating under an annual license since the original license expired. PacifiCorp filed an application with FERC for a new operating license for the Klamath Hydroelectric Project in 2004. During relicensing, several agencies, led by the NOAA Fisheries Service, in addition to other agencies with 10(a) authorities, recommended to FERC under Section 10(a) authority of the FPA, removal of the Four Facilities as the preferred measure to protect declining Klamath River fisheries. Concurrently, under Section 18 authority of the FPA, the United States Department of Commerce (DOC) and DOI prescribed mandatory fishways and passage at each mainstem dam. Flows were conditioned from J.C. Boyle Dam downstream for riparian habitat, whitewater recreation, and fisheries by DOI under Section 4(e) authority. See the text box below that describes these sections of the FPA.

The fishway prescriptions by the DOC and DOI were supported by basin tribes, fishing interests, and conservation groups to address declining fish harvests in the lower Klamath River and to reopen blocked habitat. The fishway prescriptions and DOI's mandatory conditions were challenged by PacifiCorp and others under the Energy Policy Act of 2005, in a trial-type hearing that considered disputed issues of material fact relating to the prescriptions and conditions. The resulting Administrative Law Judge decision (*In the Matter of: Klamath Hydroelectric Project*, Docket Number 2006-NMFS-0001, September 27, 2006) found that the agencies met their burden of proof regarding most of the factual issues in dispute. FERC conducted environmental analysis of the proposed project, including the mandatory terms and conditions and prescriptions in 2007. The NOAA Fisheries Service recommended to FERC, under its Section 10(a) authority of the FPA, removal of the mainstem PacifiCorp dams as the preferred measure to protect declining Klamath fisheries. Concurrently under Section 18 authority of the FPA, the Department of Commerce and DOI prescribed mandatory fishways and passage at each mainstem dam.

The Federal Power Act

The Federal Power Act (FPA) authorizes the Federal Energy Regulatory Commission (FERC) to license hydroelectric projects in the United States.

Section 18 of the FPA states in pertinent part:

FERC “shall require the construction, maintenance, and operation by a licensee at its own expense of...such fishways as may be prescribed by the Secretary of the Interior or the Secretary of Commerce, as appropriate” Act Pub. L. 102-486, Title XVII, Section 1701(b), 106 Stat. 3008.

What is a fishway? Congress has defined fishways for the safe and timely upstream and downstream passage of fish to be limited to 'physical structures, facilities or devices necessary to maintain all life stages of such fish, and project operations and measures related to such structures, facilities, or devices which are necessary to ensure the effectiveness of such structures, facilities, or devices for such fish.' 1992 Energy Policy

Section 4(e) of the FPA provides that FERC must consider environmental requirements for licensing the hydroelectric project located on a federal reservation. Specifically, FERC may issue a license within a reservation (including National Forests, National Parks, Land and Water Conservation Fund Act lands, National Wild and Scenic Rivers Act rivers, National Trails, Wilderness Areas, National Wildlife Refuges, and other public lands) only after finding that the license will not interfere or be inconsistent with the purposes for which such reservation was created or acquired and such license shall be subject to and contain such conditions that the federal agency with jurisdiction over the reservation deems necessary for the adequate protection and utilization of the reservation.

Section 10(a) of the FPA requires that: “In order to ensure that the project adopted will be best adapted to a comprehensive plan for development of the waterway, the Commission will consider:

- A. The extent to which the project is consistent with a comprehensive plan (where one exists) for improving, developing, or conserving a waterway or waterways affected by the project, and
- B. The recommendations of Federal and State agencies as well as Indian Tribes exercising administration over flood control, navigation, irrigation, recreation, cultural and other relevant resources of the State in which the project is located, and the recommendations (including fish and wildlife recommendations) of Indian tribes affected by the project.”

Section 10(j) of the FPA requires FERC to solicit recommendations from the U.S. Department of Commerce's National Marine Fisheries Service, the U.S. Department of Interior's Fish and Wildlife Service and state fish and wildlife agencies. Such recommendations are pursuant to the Fish and Wildlife Coordination Act (16 U.S.C. 661 et seq.) FERC has to address and then either accept or refute recommendations from these resource agencies relative to the protection, mitigation, and enhancement of fish and wildlife resources impacted by the project.

Before FERC may issue any new license for the Klamath Hydroelectric Project, the states of Oregon and California must also issue water quality certification under Section 401 of the Clean Water Act (CWA). The California State Water Resources Control Board cannot issue certification until environmental documentation sufficient for consideration of the alternative of conditioning certification on dam removal is completed consistent with CEQA.

The agencies' mandatory prescriptions and conditions along with FERC's required conditions would result in significant operational changes to the hydroelectric project, substantially reducing power generation capacity (about 20 megawatts, or 24 percent of annual generation) and causing the Klamath Hydroelectric Project to operate at a net annual loss (FERC 2007).

PacifiCorp estimates that it would incur relicensing capital costs in excess of \$400 million (with the majority of costs resulting from implementation of aquatic resource protection, mitigation, and enhancement measures) and \$60 million in operations and maintenance costs over a 40-year license term (Oregon Public Utilities Commission 2010). PacifiCorp would be allowed to recover these costs through customer charges, if approved through future Public Utilities Commission actions.

Reclamation's Klamath Project

In addition to the Klamath Basin's distinctive setting, biological resources, and cultural history, the basin is the site of one of the first developments authorized under the 1902 Reclamation Act. Development and construction of what is today known as Reclamation's Klamath Project took place between 1905 and 1966, with major features of the project completed by the early 1940s. As the largest water management effort in the Upper Klamath Basin, its features include a system of reservoirs, dams, canals, and pumps (Figure 1-3). Reclamation's Klamath Project was originally authorized for the purpose of providing irrigation water to farms at a time when the frontier of the American west was still developing and increasing numbers of farmers were drawn to the fertile land in northern California and southern Oregon. Link River Dam, completed in 1921, is a major feature of Reclamation's Klamath Project. This dam is owned by Reclamation, but is operated by PacifiCorp under agreement with Reclamation.

The KHSA sets a cost cap of \$450 million for removal of the Four Facilities. Of this, an amount not to exceed \$200 million would come from additional charges to PacifiCorp ratepayers residing in California and Oregon, and up to \$250 million would come from the sale of bonds in California or other means deemed appropriate financing mechanisms to cover removal costs in excess of the rate-payer contributions. The United States government would not be responsible for the costs of facilities removal.

ES.2.2.2 The Four Facilities and PacifiCorp Involvement in the KHSA/KBRA

The economic reality of implementing fishways and meeting CWA 401 Certification at the Four Facilities combined with the prospect of annual loss of revenue, and the protection of prudent and reasonable utility rates for its customers encouraged PacifiCorp to enter into collaborative discussions with basin stakeholders to identify ways to improve basin fisheries. These discussions resulted in PacifiCorp signing the KHSA. As described below in Section ES.4.2, PacifiCorp is not a direct signatory of the KBRA.

Table ES-1 summarizes data about the Four Facilities. Figures ES-3 through ES-6 show the four dams and associated hydropower facilities.

Table ES-1. Hydroelectric Dams (Four Facilities) on the Mainstem Klamath River

Dam	Year Operational	Maximum Power Generation Capacity (megawatts)	Annual Average Generation Rate (megawatts)	Dam Height (feet)
J.C. Boyle	1958	98	38	68
Copco 1	1918	20	12	126
Copco 2	1925	27	15	33
Iron Gate	1962	18	13	194
Total	--	163	78¹	--

Source: FERC 2007

Notes: ¹ This annual average generation rate is only for the Four Facilities and does not include the Fall Creek or East and West Side Facilities. Under the agencies' mandatory prescriptions and conditions, along with FERC's required conditions, average annual generation for the entire project would drop by approximately 20 megawatts.



Figure ES-3. J.C. Boyle Dam and Powerhouse



Figure ES-4. Copco 1 Dam and Powerhouse

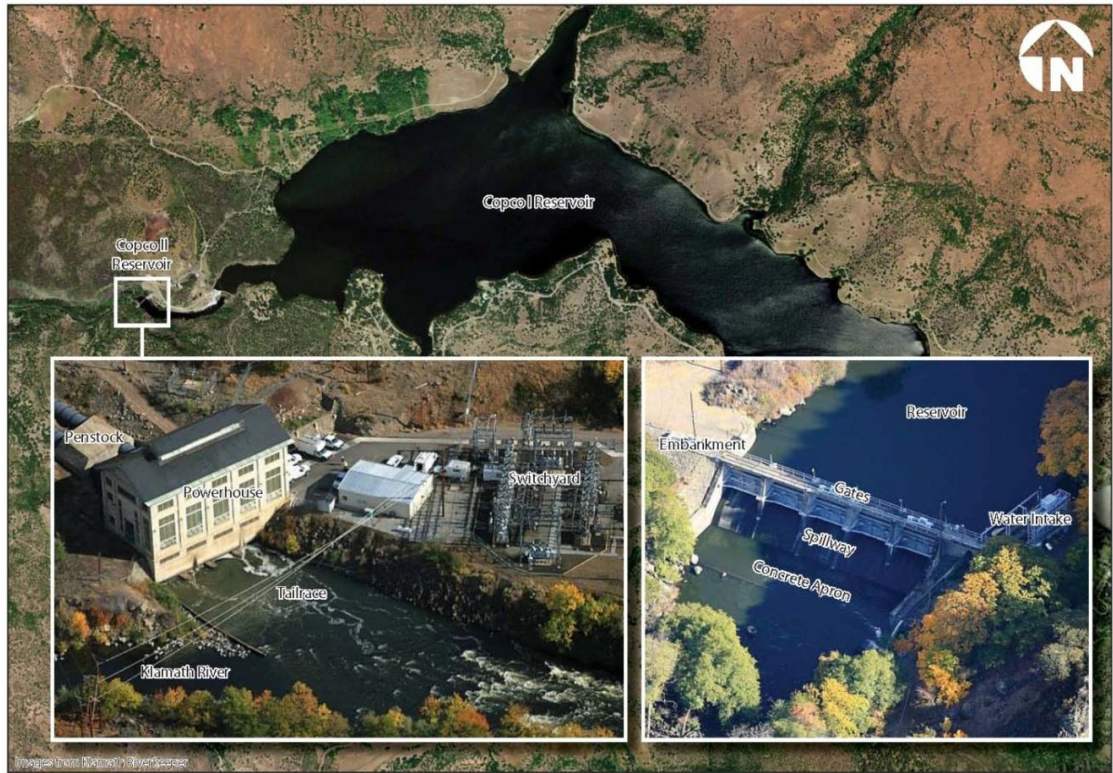


Figure ES-5. Copco 2 Powerhouse (left photo) and Dam

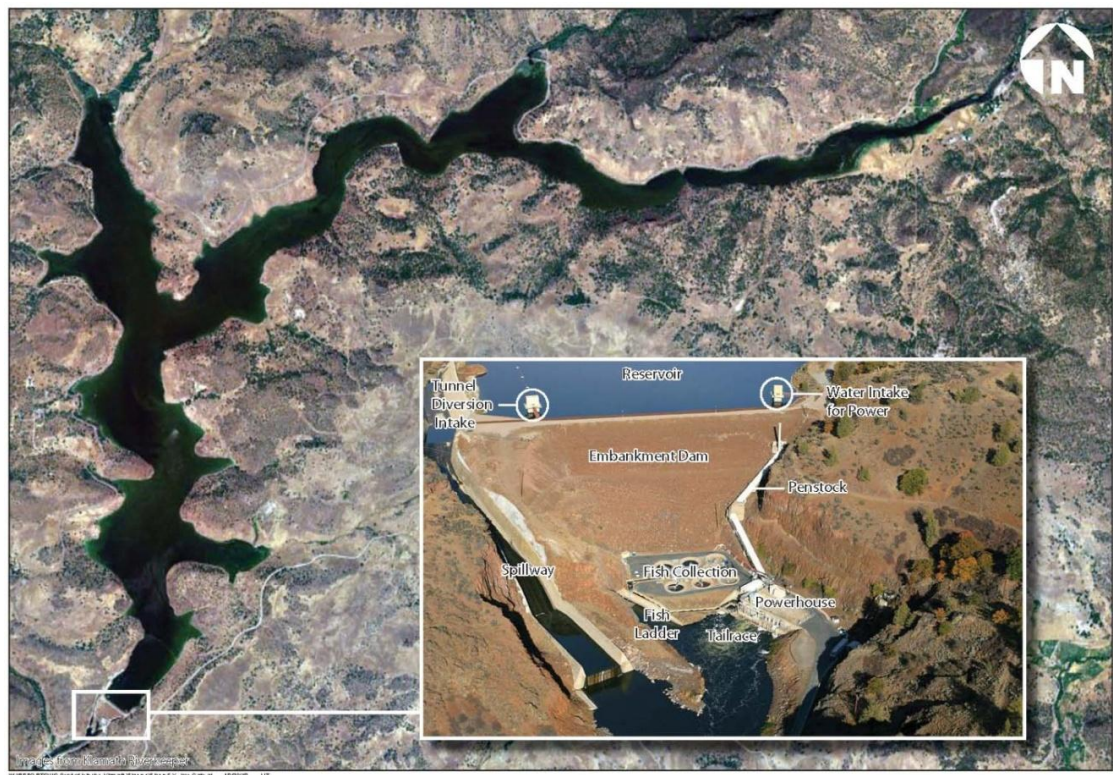


Figure ES-6. Iron Gate Dam, Reservoir, and Power Generating Facilities

ES.3 Environmental Review

As described above, this EIS/EIR is being prepared in compliance with NEPA and CEQA. The DOI is Lead Agency under NEPA, and the CDFG is Lead Agency under CEQA. DOI and the CDFG are referred to together in this EIS/EIR as the Lead Agencies. The Purpose and Need for the Proposed Action (NEPA) and the Project Objectives (CEQA) are described below, and together form the basis for alternatives development and impact analysis considered in this EIS/EIR.

NEPA Purpose and Need

The need for the Proposed Action is to advance restoration of the salmonid fisheries in the Klamath Basin consistent with the KHSA and the connected KBRA. The purpose is to achieve a free flowing river condition and full volitional fish passage as well as other goals expressed in the KHSA and KBRA. By the terms of the KHSA, the Secretary will determine whether the Proposed Action is appropriate and should proceed. In making this determination, the Secretary will consider whether removal of the Four Facilities will advance the restoration of the salmonid fisheries of the Klamath Basin, and is in the public interest, which includes but is not limited to consideration of potential impacts on affected local communities and Tribes.

CEQA Project Objectives

As required by CEQA, a lead agency must identify the objectives sought by the proposed project. For this project, CDFG as lead agency has identified the following objectives:

1. Advance restoration of the salmonid fisheries in the Klamath Basin.
2. Restore and sustain natural production of fish species throughout the Klamath Basin in part by restoring access to habitat currently upstream of impassable dams.
3. Provide for full participation in harvest opportunities for sport, commercial, and tribal fisheries.
4. Establish reliable water and power supplies, which sustain agricultural uses and communities and NWRs.
5. Improve long-term water quality conditions consistent with designated beneficial uses.
6. Contribute to the public welfare and the sustainability of Klamath Basin communities.
7. To be consistent with the goals and objectives of KHSA and KBRA.

ES.4 Klamath Settlement Agreements

ES.4.1 Klamath Hydroelectric Settlement Agreement

The KHSA establishes the process for additional studies, the development of a Detailed Plan for dam removal and environmental review to support the Secretary's Determination⁵ as to whether removal of the Four Facilities on the Klamath River that are owned by PacifiCorp will accomplish the following two goals: 1) to advance restoration of the salmonid fisheries of the basin, and 2) be in the public interest, which includes, but is not limited to, consideration of the potential impacts on affected local communities and Indian Tribes.

The KHSA also includes provisions for the interim operation of the Four Facilities by PacifiCorp and the process to transfer, decommission, and remove the dams.

Secretarial Determination and Connected Actions

If the Secretary publishes an Affirmative Determination, the process for facilities removal will proceed. The Secretary will also concurrently designate the dam removal entity. The dam removal entity, once identified, would refine the Detailed Plan to create a Definite Plan for Facilities Removal including the methods for removal and estimated costs.

In addition to the decommissioning and removal of the four hydroelectric dams, actions associated with an Affirmative Determination would include the transfer of Keno Dam ownership from PacifiCorp to DOI.

An Affirmative Secretarial Determination and federal authorizing legislation are two early key milestones towards full implementation of the KBRA.

A Negative Determination would be a potential termination event for the KHSA and facilities removal would likely not proceed. The FERC relicensing process would resume.

⁵ As defined in the KHSA, there are two different determinations on removal of the Four Facilities that the Secretary could reach: 1) Affirmative Determination: A determination by the Secretary under Section 3 of the KHSA that Facilities Removal should proceed; and, 2) Negative Determination: A determination by the Secretary under Section 3 of the KHSA that Facilities Removal should not proceed. The Secretary bases his determination on whether the conditions of Section 3.3.4 of the KHSA have been met and whether, in his judgment, Facilities Removal will accomplish the two goals stated above in Section ES.2.1. In the event of an Affirmative Determination, California and Oregon each shall provide Notice to the Secretary and other Parties as to whether the state concurs with the Affirmative Determination. In its concurrence, each state shall consider whether: 1) significant impacts identified in its environmental review can be avoided or mitigated as provided under state law; and 2) Facilities Removal will be completed within the State Cost Cap (KHSA Section 3.3.5A). If the Secretary determines not to proceed with Facilities Removal, the KHSA terminates unless the Parties agree to a cure for this potential termination event (KHSA Section 3.3.5B).

ES.4.2 Klamath Basin Restoration Agreement

Concurrently with the signing of the KHSA, the same Parties, with the exception of the two federal parties and PacifiCorp, signed an accompanying agreement—the KBRA. The KBRA includes interrelated plans and programs intended to benefit fisheries throughout the basin, water and power users in the Upper Klamath Basin, counties, Indian Tribes, and basin communities. The KBRA brought many parties together to support one another's efforts to restore fisheries in the Klamath Basin and provide for sustainable agricultural communities.

Implementation of the KBRA is intended to accomplish the following:

1. Restore and sustain natural fish production and provide for full participation in ocean and river harvest opportunities of these fish.
2. Establish reliable water and power supplies for agricultural uses, communities, and National Wildlife Refuges (NWRs).
3. Contribute to public welfare and sustainability of all communities through reliable water supply; affordable electricity; programs to offset potential property tax losses and address economic development issues in counties; and efforts to support tribal fishing and long-term economic self-sufficiency.

The key negotiated outcomes of the KBRA include mutually-beneficial agreements for the Klamath, Karuk, and Yurok Tribes not to exercise water right claims that would conflict with water deliveries to Reclamation's Klamath Project water users and for project water users to accept reduced water deliveries. As a result, there would be more support for fisheries restoration programs, greater certainty about water deliveries at the beginning of each growing season, and agreement and assurances that certain of the parties will work collaboratively to resolve outstanding water-right contests pending in the Oregon Klamath Basin Adjudication process. In addition, the KBRA includes an Off-Project voluntary Water Use Retirement Program in the Upper Basin, three restoration projects intended to increase the amount of water storage in the Upper Klamath Basin, regulatory assurances, county and tribal economic development programs, and tribal resource management programs.

Copies of the KHSA and KBRA in their entirety are available electronically at:

<http://klamathrestoration.gov/>.

ES.5 Alternatives Development

As part of the environmental review process, the Lead Agencies developed a full range of alternatives. A detailed description of this process can be found in this EIS/EIR, Appendix A titled Alternatives Formulation Report.

ES.5.1 Public Scoping and Alternatives Identification

The Lead Agencies held seven public scoping meetings in locations around the Klamath Basin to receive input on alternatives and concerns regarding the project purpose, needs and objectives. Written and verbal comments were accepted at each meeting and comments were also received

by mail and electronically throughout the scoping period of June 14, 2010 through July 21, 2010. A Scoping Report that summarizes all comments received through July 21, 2010 was published in September 2010 and is available on the project website (<http://klamathrestoration.gov/>).

Following the scoping process, the Lead Agencies, along with the cooperating and responsible agencies, identified a wide range of alternatives that represent diverse viewpoints and needs, including alternatives suggested during the EIS/EIR public scoping process. This resulted in a set of 18 possible alternatives to be considered for detailed analysis (the initial list of action alternatives is described in Appendix A, Alternatives Formulation Report). The Lead Agencies applied a screening process to the 18 alternatives to determine which alternatives should move forward for further analysis. In order to determine which alternatives met all or most of the purpose and need/project objectives, and were potentially feasible, specific screening considerations were created based on NEPA (40 CFR Part 1502.14(a)) and CEQA guidance (CEQA Guidelines, §15126.6 (a)). Under CEQA, alternatives do not need to meet all of the project objectives; alternatives should be included if they can meet most of the objectives and avoid or substantially lessen significant environmental impacts of the project. Figure ES-7 illustrates the process that the Lead Agencies conducted to identify and screen alternatives and to select alternatives for more detailed analysis.

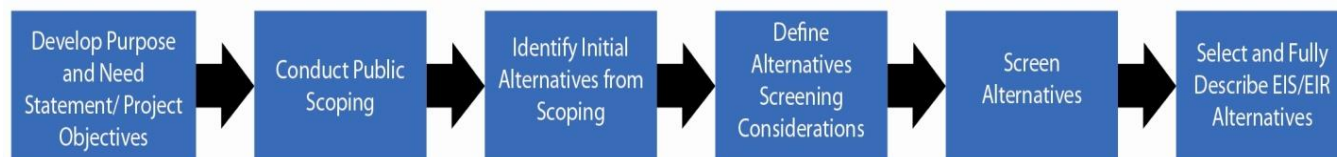


Figure ES-7. Alternatives Development and Screening Process

After the process of initial alternative screening, four action alternatives in addition to the No Action/No Project Alternative (Alternative 1) were selected to move forward for more detailed analysis in the EIS/EIR. Alternatives 2 and 3, the Proposed Action and Partial Facilities Removal, both fully meet the purpose and need/project objectives. While Alternative 4, Fish Passage at Four Dams and Alternative 5, Remove Copco 1 and Iron Gate Dams, Construct Fish Passage at J.C. Boyle and Copco 2 Dams, do not fully meet the purpose and need/project objectives, both alternatives were moved forward to the EIS/EIR for further review because at the time of developing a reasonable range of alternatives the Lead Agencies recognized the potential for Alternatives 4 and 5 to have fewer short-term adverse environmental impacts than the Proposed Action. Consideration of these alternatives would give the Secretary a reasonable range of alternatives to inform decision-making. Analysis of these alternatives will provide the Secretary with information needed to make a decision, and potentially to mix and match elements of the alternatives, if needed, to create an alternative that would reduce environmental impacts and increase environmental benefits.

ES.6 Alternatives Receiving Full Analysis in the EIS/EIR

The EIS/EIR analyzes five alternatives in detail, including the No Action/No Project Alternative.

ES.6.1 Alternative 1 - No Action/No Project Alternative

NEPA requires an EIS to “include the alternative of no action” (40 CFR Part 1502.14(d)). CEQA requires an EIR to include a No Project Alternative. CEQA Guidelines Section 15126.6(e)(2) states that “The ‘no project’ analysis shall discuss the existing conditions at the time the notice of preparation is published, or if no notice of preparation is published, at the time environmental analysis is commenced, as well as what would be reasonably expected to occur in the foreseeable future if the project were not approved, based on current plans and consistent with available infrastructure and community services.” For the Klamath Facilities Removal EIS/EIR, NEPA’s No Action Alternative and CEQA’s No Project Alternative describe the same conditions, and this alternative is referred to as the No Action/No Project Alternative.

The No Action/No Project Alternative represents the state of the environment without the Proposed Action or any of the alternatives. For the purposes of this analysis, the No Action/No Project Alternative will continue current operations with the Four Facilities remaining in place and PacifiCorp operating under the current annual license. The existing license has no requirements for additional fish passage or implementation of the agencies’ mandatory prescriptions and conditions that are currently before FERC in the relicensing process. PacifiCorp would continue to coordinate with Reclamation to operate the Klamath Hydroelectric Project in compliance with the existing NOAA Fisheries Service and USFWS biological opinions issued for Reclamation’s Klamath Project Operation Plan. PacifiCorp would also continue to operate the Iron Gate Hatchery under its current operations.

The KBRA is not included in the No Action/No Project Alternative. However, the No Action/No Project Alternative would include the ongoing resource management activities (these actions are described in further detail in Chapter 2 of this EIS/EIR). These resource management actions were started or were under consideration before the KBRA was developed and will move forward at some level even without the KBRA.

The No Action/No Project Alternative also includes “reasonably foreseeable actions” that are independent of FERC licensing and are expected to occur throughout the period of analysis (2012 to 2061). Reasonably foreseeable actions include the Total Maximum Daily Load (TMDL) provision of the Clean Water Act (Section 401) issued by the Oregon Department of Environmental Quality and California North Coast Regional Water Quality Control Board for impaired water bodies. There are currently nine TMDLs established in the Klamath Basin (see Section 3.2.2.4). Under the No Action/No Project Alternative, full attainment of these TMDLs would result in long-term water quality improvements in the basin; however, implementation mechanisms, funding, and timing are currently unknown.

ES.6.2 Alternative 2 - Full Facilities Removal of Four Dams (Proposed Action)

The Full Facilities Removal of Four Dams Alternative (the Proposed Action) includes the removal of the Four Facilities during a 20-month period which includes an 8-month period of site preparation and partial drawdown at Copco 1 and a 12-month period for full drawdown and removal of facilities. This alternative would include the complete removal of the dams, power generation facilities, water intake structures, canals, pipelines, ancillary buildings, and dam foundations to create a free-flowing river. Preparation for dam removal would begin in May 2019 for Iron Gate Dam and June 2019 for Copco 1 Dam. Deconstruction efforts for the J.C. Boyle and Copco 2 Facilities would commence after January 1, 2020, and all four dams would be completely removed by December 31, 2020. This alternative would include implementation of the KBRA and the transfer of Keno Dam to DOI as connected actions. Figure ES-8 illustrates what full facilities removal would look like at Iron Gate Dam.



**Figure ES-8. Simulation of Iron Gate Dam
Before and After Full Facilities Removal**

ES.6.2.1 KBRA

The KBRA is being analyzed in this EIS/EIR as a connected action to the Proposed Action. Implementation of the KBRA and the KHSA is dependent on an Affirmative Determination.

Table ES-2 provides a summary of KBRA programs. The programs with sufficient detail to investigate for potential environmental effects are analyzed in this EIS/EIR. These programs include the following (a more detailed description of the approach to analysis of the KBRA is in Section 3.1 of this EIS/EIR):

Fisheries Program - The Fisheries Program includes habitat restoration throughout the basin; a fisheries reintroduction and management plan; a fisheries monitoring plan; and actions intended to improve flow conditions and water quality for fish.

Water and Power Programs The Water and Power Programs include an agreement regarding limitations on water diversions to Reclamation's Klamath Project, which includes a water diversion plan for the Tule Lake and Lower Klamath Lake NWRs. The programs also include a voluntary Water Use Retirement Program in the Upper Basin to increase inflow into Upper Klamath Lake and to provide a basis for further efforts among certain parties to work collaboratively for more reliable sources of water for fish harvests and agriculture. Additionally, there are agreements and assurances to resolve outstanding water right contests in the Oregon Klamath Basin Adjudication process.

Table ES-2. KBRA Program Summary

Fisheries Program:
Fish Habitat Restoration Activities ¹
Fisheries Restoration Phase I Plan
Fisheries Restoration Phase II Plan
Fisheries Reintroduction Plan – Phase I, Oregon
Fisheries Reintroduction Plan – Phase II, Oregon
Fisheries Reintroduction Plan – California
Fisheries Monitoring Plan
Additional Water Storage Projects:
Williamson River Delta Project
Agency Lake and Barnes Ranches Project
Wood River Wetland Restoration Project
Future Storage Opportunities ²
Water and Power Programs:
Water Diversion Allocations for Reclamation's Klamath Project and National Wildlife Refuges ³
Groundwater Technical Investigations
On-Project Plan
Winter Shortage Plan
Water Use Retirement Program
Off-Project Water Settlement
Off-Project Reliance Program
Power for Water Management Program
Drought Plan
Emergency Response Plan
Climate Change Assessment
Environmental Water Management
Interim Flow and Lake Level Program
Regulatory Assurances Programs:
Fish Entrainment Reduction
General Conservation Plan or Habitat Conservation Plan
County and Tribal Programs:
Klamath County Economic Development Plan
California Water Bond (Siskiyou County Economic Development Funding)
Tribal Programs Fisheries and Conservation Management
Tribal Programs Economic Revitalization
Mazama Forest Project
Klamath Tribes Interim Fishing Site

Notes:

1. While on-going fish habitat restoration activities are not part of the Proposed Action because they are conducted under current authorities and funding levels, the scope of these activities would be increased in magnitude and accelerated through implementation of the KBRA. Habitat restoration under the Proposed Action would be guided by the Fisheries Restoration Plan to be developed under the KBRA.
2. Development of additional storage is also intended to restore habitats for endangered suckers, and would occur with implementation of KBRA and associated funding.
3. During the Interim Period, water diversion limitations to Reclamation's Klamath Project water users would conform to the limits described in the Diversion Limitations section as closely as possible. However, before full implementation of the On-Project Plan, it might not be possible to fully comply with the diversion limitations in all years.

County and Tribal Programs - County and tribal programs include economic development for local governments and tribes; regulatory assurances that adverse impacts on local communities would be minimized; and tribal fisheries and natural resource conservation.

ES.6.3 Alternative 3 - Partial Facilities Removal of Four Dams

The Partial Facilities Removal of Four Dams Alternative would include removal of enough of each dam to allow free-flowing river conditions and volitional fish passage for all Klamath River anadromous species at all times. Under this alternative, portions of each dam facility would remain in place, including ancillary buildings and structures such as powerhouses, foundations, tunnels, and pipes (Figure ES-9). Some of these remaining features would require perpetual maintenance and security measures to prevent unauthorized entry and safety hazards. All tunnel openings would be sealed and all potentially hazardous materials found in powerhouses and machinery would be removed prior to final decommissioning and securing of buildings.

The schedule for Partial Facilities Removal of Four Dams would be the same as for the Proposed Action (the Full Facilities Removal of Four Dams Alternative). The Partial Facilities Removal of Four Dams Alternative also includes the transfer of Keno Dam to DOI and implementation of the KBRA (as in the Proposed Action).

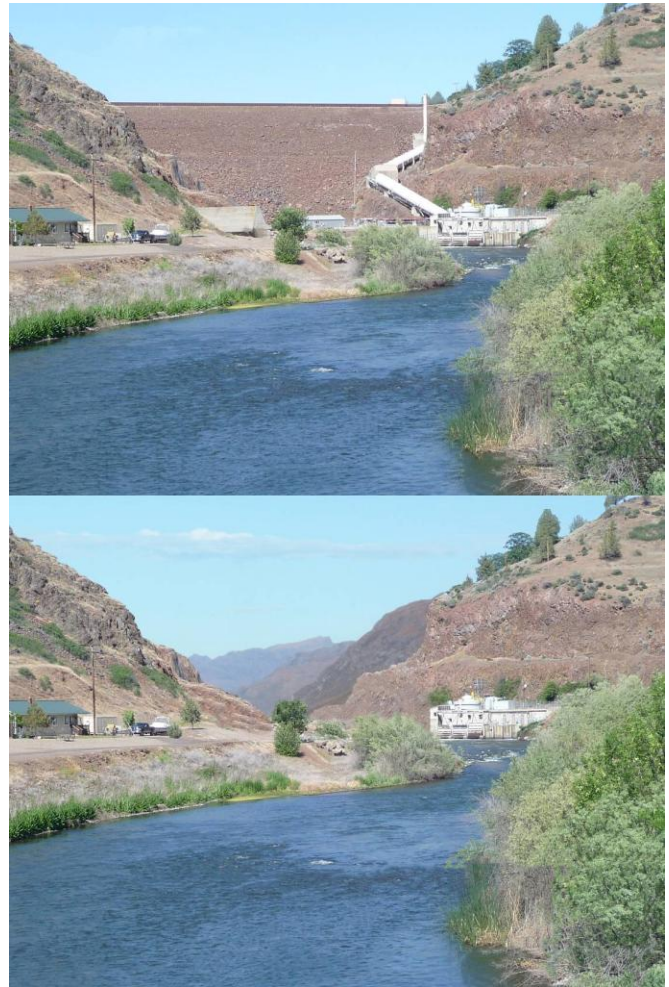


Figure ES-9. Simulation of Partial Facilities Removal

ES.6.4 Alternative 4 - Fish Passage at Four Dams

The Fish Passage at Four Dams Alternative would include construction of fish passage facilities at each of the Four Facilities. This alternative would retain all hydropower generating facilities and operations; although operations would change in response to DOI mandatory flow conditions and the DOC and DOI fishway prescriptions. The Lead Agencies used the prescriptions developed during the FERC relicensing process to describe the facilities needed to achieve fish passage and required flow conditions. The prescriptions also included flow and operational

requirements that are included in this alternative. Figure ES-10 shows an example of a cast-in-place pool and weir fish ladder that is similar to that proposed for upstream fish passage at all four dams under this alternative. Typical downstream passage would include screening the fish away from the intake structures for the power generation facilities and the spillway modifications (if they are unsuitable for downstream passage).

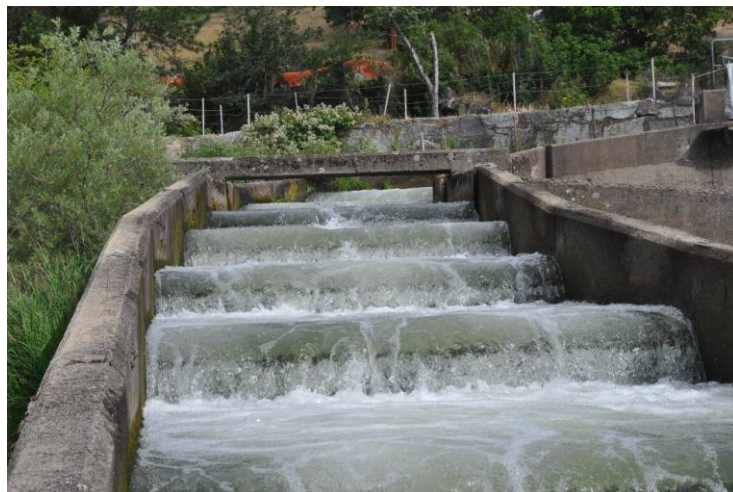


Figure ES-10. Example of Cast-In-Place Pool and Weir Fish Ladder

The Hydropower Licensee would need to re-enter the FERC process to implement this alternative and would be responsible for its long-term operation and maintenance. To meet essential flows in the bypass reaches, less water would pass through the power generating facilities than under current conditions, reducing power production. In addition, this alternative would result in restricted project ramping rates and would only allow peaking one day per week.

The Fish Passage at Four Dams Alternative would not satisfy the conditions in the KHSA. Consequently, it is assumed that the KBRA and the Keno Dam Transfer would not be implemented. For the purposes of this analysis, alternatives that would not result in full implementation of the KHSA do not include the KBRA as a connected action to the alternative. Additionally, the transfer Keno Dam to DOI would not move forward as a connected action.

This alternative would follow the schedule proposed in the FERC relicensing process. The prescriptions include a schedule for implementation and recommend that downstream facilities be installed prior to upstream passage facilities (DOI and NOAA Fisheries Service 2007). Table ES-3 shows the schedule for construction of the fish passage facilities at each dam, based on these constraints.

Table ES-3. Timetable for Fish Passage Improvements at each Dam from Date of FERC License Renewal

Dam	Upstream Fish Passage	Spillway Modifications ¹	Tailrace Barrier ¹	Screens & Bypass
J.C. Boyle	4 years	4 years	4 years	4 years
Copco 1	6 years	6 years	N/A	6 years
Copco 2	6 years	6 years	8 years	6 years
Iron Gate	5 years	5 years	N/A	5 years

Key:

N/A: Not Applicable

Notes:

1. The prescriptions require studies to determine the need for and design of spillway modifications and tailrace barriers. For the purposes of analysis in this EIS/EIR, Alternative 4 includes some specific fishway facility design and construction details that are beyond those required in the prescriptions.

ES.6.5 Alternative 5 - Fish Passage at J.C. Boyle and Copco 2, Remove Copco 1 and Iron Gate

The Fish Passage at J.C. Boyle and Copco 2, Remove Copco 1 and Iron Gate Alternative includes the full removal of the Iron Gate and Copco 1 facilities and installation of upstream and downstream fish passage facilities at both the J.C. Boyle and Copco 2 Dams. Implementation of this alternative would provide fish passage while retaining some hydropower generation capacity, and would improve water quality (specifically, dissolved oxygen, water temperatures, and algal toxins) through removal of the two largest reservoirs. To meet essential flows in the bypass reaches, less water would pass through the power generating facilities at the J.C. Boyle and Copco 2 developments and power production would be reduced as compared to current conditions.

Similar to the Fish Passage at Four Dams Alternative, the Fish Passage at J.C. Boyle and Copco 2, Remove Copco 1 and Iron Gate Alternative would incorporate most of the DOI and DOC prescriptions from the FERC relicensing process related to fish passage at J.C. Boyle and Copco 2 Dams (see Attachment B of Appendix A for a list of prescriptions). Alternative 5 would not incorporate the prescriptions related to peaking power at J.C. Boyle and recreation releases. In Alternative 5, Copco 2 Dam would be the only dam remaining downstream from J.C. Boyle Dam. Copco 2 Reservoir is very small, and does not have adequate capacity to reregulate flows associated with peaking operations so that they are suitable for fish downstream. Therefore, Alternative 5 would not include peaking operations or recreation releases on any days at J.C. Boyle Dam.

The Hydropower Licensee would need to re-enter the FERC process to implement this alternative and would be responsible for the long-term operation and maintenance of the dams and fish passage facilities. The Fish Passage at J.C. Boyle and Copco 2, Remove Copco 1 and Iron Gate Alternative would not satisfy the purposes of the KHSA to restore free flowing river conditions. Consequently, it is assumed in this analysis that the KBRA and Keno Dam Transfer would not be implemented. This alternative would follow a schedule similar to that of the Proposed Action, and could be completed by December 2020.

ES.7 Effects of the No Action/No Project, Proposed Action, and Action Alternatives

This section describes the significant and unavoidable adverse impacts, as well as the beneficial effects, of the five alternatives.

ES.7.1 Significant and Unavoidable Adverse Impacts

Significant and unavoidable adverse impacts refer to the environmental consequences of an action that cannot be avoided by redesigning the project, changing the nature of the project, or implementing mitigation measures. NEPA regulations require a discussion of any adverse impacts that cannot be avoided as a result of the proposed action (40 Code of Federal Regulations Part 1502.16). NEPA also requires a discussion of means to mitigate adverse impacts. CEQA Guidelines (Section 15126.2 (b)) require discussion of significant environmental effects that cannot be avoided, as well as significant environmental effects that can be mitigated but not reduced to an insignificant level. These impacts are summarized in Table ES-4. Table ES-5 summarizes the adverse environmental impacts of the resources analyzed in this EIS/EIR specific to NEPA including Socioeconomics, and Environmental Justice resources⁶.

A full listing of all impacts, including those that can be reduced to a less than significant level, is presented in Chapter 5 of this EIS/EIR.

The specific approach used to evaluate environmental effects of each alternative relative to each environmental resource is explained in Section 3.1 and in the resource sections throughout Chapter 3.

⁶ Effects relative to tribal trust resources are not displayed in this table given that no new adverse effects were identified relative to the alternatives analyzed in this EIS/EIR. Section 3.12, Tribal Trust of this EIS/EIR does however summarize the existing and ongoing tribal trust impacts present in the Klamath Basin.

Table ES-4. Summary of Significant and Unavoidable Impacts

Potential Impact	Alternative(s)	Significance Pursuant to CEQA	Proposed Mitigation	Significance After Mitigation Pursuant to CEQA
3.2 Water Quality				
<i>Water Temperature</i>				
Upper Klamath Basin				
Dam removal and/or elimination of hydropower peaking operations at J.C. Boyle Powerhouse could cause short-term ⁷ and long-term ⁸ alterations in daily water temperatures and fluctuations in the J.C. Boyle bypass and peaking reaches.	2, 3, 5	S	None	S
Dam removal and conversion of the reservoir areas to a free-flowing river could cause short-term and long-term increases in spring time water temperatures and decreases in late summer/fall water temperatures in the Hydroelectric Reach downstream of Copco 1 Reservoir.	2, 3, 5	S for springtime	None	S for springtime
<i>Lower Klamath Basin</i>				
Dam removal and conversion of the reservoir areas to a free flowing river could result in short-term and long-term increases in spring water temperatures and decreases in late summer/fall water temperatures in the Lower Klamath River.	2, 3, 5	S – Iron Gate Dam to Salmon River for springtime	None	S – Iron Gate Dam to Salmon River for springtime
<i>Suspended Sediments</i>				
Upper Klamath Basin				
Draining the reservoirs and release of sediment could cause short-term increases in suspended material in the Hydroelectric Reach downstream of J.C. Boyle Dam.	2, 3, 5	S	None	S
Lower Klamath Basin				
Draining the reservoirs and release of sediment could cause short-term increases in suspended material in the lower Klamath River and the Klamath Estuary.	2, 3, 5	S	None	S

⁷ Short-term is defined as <2 years following dam removal.

⁸ Long-term is defined as 2-50 years following dam removal.

Table ES-4. Summary of Significant and Unavoidable Impacts

Potential Impact	Alternative(s)	Significance Pursuant to CEQA	Proposed Mitigation	Significance After Mitigation Pursuant to CEQA
<i>Dissolved Oxygen</i>				
Upper Klamath Basin				
Draining the reservoirs and release of sediment could cause short-term increases in oxygen demand (Immediate Oxygen Demand [IOD] and Biological Oxygen Demand [BOD]) and reductions in dissolved oxygen in the Hydroelectric Reach downstream of J.C. Boyle Reservoir.	2, 3, 5	S	None	S
Lower Klamath Basin				
Dam removal and sediment release could cause short-term increases in oxygen demand (Immediate Oxygen Demand [IOD] and Biological Oxygen Demand [BOD]) and reductions in dissolved oxygen in the lower Klamath River, the Klamath Estuary, and the marine nearshore environment.	2, 3, 5	S (lower Klamath River from Iron Gate Dam to Clear Creek)	None	S (lower Klamath River from Iron Gate Dam to Clear Creek)
3.3 Aquatic Resources				
<i>Critical Habitat</i>				
Reservoir drawdown associated with dam removal could alter the quality of critical habitat.	2, 3, 5	S (short-term for coho)	None	S (short-term for coho)
<i>Essential Fish Habitat</i>				
Reservoir drawdown associated with dam removal could alter the quality of EFH.	2, 3, 5	S (short-term for Chinook and coho)	None	S (short-term for Chinook and coho)
<i>Species Impacts</i>				
<u>Coho Salmon</u>				
Reservoir drawdown associated with dam removal could alter SSCs and bedload sediment transport and deposition and affect coho salmon.	2, 3, 5	S (Upper Klamath River, Mid-Klamath River, Shasta River, and Scott River)	AR-1: Protection of mainstem spawning; AR-2: Protection of outmigrating juveniles; AR-3: Fall flow pulses; AR-4: Hatchery management	S (Upper Klamath River, Mid-Klamath River, Shasta River, and Scott River population units)

Table ES-4. Summary of Significant and Unavoidable Impacts

Potential Impact	Alternative(s)	Significance Pursuant to CEQA	Proposed Mitigation	Significance After Mitigation Pursuant to CEQA
<u>Steelhead</u>				
Reservoir drawdown associated with dam removal could alter SSCs and bedload sediment transport and deposition and affect steelhead in the short-term.	2, 3, 5	S	AR-1: Protection of mainstem spawning; AR-2: Protection of outmigrating juveniles; AR-3: Fall flow pulses; AR-4: Hatchery management	S
<u>Pacific Lamprey</u>				
Reservoir drawdown associated with dam removal could alter SSCs and bedload sediment transport and deposition and affect Pacific lamprey in the short-term.	2, 3, 5	S	AR-2: Protection of Outmigrating Juveniles; AR-5: Pacific lamprey capture and relocation.	S
<u>Green Sturgeon</u>				
Reservoir drawdown associated with dam removal could alter SSCs and bedload sediment transport and deposition and affect green sturgeon.	2, 3, 5	S	AR-3: Fall flow pulses	S
<u>Freshwater mussels</u>				
Reservoir drawdown associated with dam removal could alter SSCs and bedload sediment transport and deposition and affect freshwater mussels in the short-term.	2, 3, 5	S	AR-7: Freshwater mussel relocation	S
<u>Benthic Macroinvertebrates</u>				
Reservoir drawdown associated with dam removal could alter SSCs and bedload sediment transport and deposition and affect macroinvertebrates.	2, 3, 5	S	None	S
<u>3.4 Algae</u>				
<u>Hydroelectric Reach</u>				
Dam removal and the elimination of hydropower peaking operations could result in long-term increased biomass of nuisance periphyton (attached algae) in low-gradient channel margin areas within the Hydroelectric Reach. ⁹	2, 3, 5	S	None	S

⁹ Increased periphyton biomass would not affect levels of algal toxins in the Klamath River. The noxious blooms of phytoplankton (suspended algae) occurring in the calm, lake-like waters of Copco 1 and Iron Gate Reservoirs are responsible for the production of algal toxins, such as microcystin, in the Klamath River downstream of Iron Gate Dam (see Section 3.4). Noxious phytoplankton would not thrive in the free-flowing river following dam removal.

Table ES-4. Summary of Significant and Unavoidable Impacts

Potential Impact	Alternative(s)	Significance Pursuant to CEQA	Proposed Mitigation	Significance After Mitigation Pursuant to CEQA
3.9 Air Quality				
Vehicle exhaust and fugitive dust emissions from dam removal activities could increase emissions of VOC, NO _x , CO, SO ₂ , PM ₁₀ , and PM _{2.5} to levels that could exceed Siskiyou County's thresholds of significance.	2, 3	S	AQ-1: MY 2015 or newer engines for offroad construction equipment AQ-2: MY 2000 or newer engines for on-road construction equipment AQ-3: MY 2010 or newer engines for haul trucks	S
Reservoir restoration actions could result in short-term and temporary increases in criteria pollutant emissions from the use of helicopters, trucks, and barges that could exceed Siskiyou County's thresholds of significance.	2, 3, 5	S	AQ-1: MY 2015 or newer engines for offroad construction equipment AQ-2: MY 2000 or newer engines for on-road construction equipment AQ-3: MY 2010 or newer engines for haul trucks	S
<i>Trap and Haul Operations</i>				
Implementation of trap and haul measures could result in temporary increases in air quality pollutant emissions from vehicle exhaust.	4, 5	S	AQ-1: MY 2015 or newer engines for offroad construction equipment AQ-2: MY 2000 or newer engines for on-road construction equipment AQ-3: MY 2010 or newer engines for haul trucks	S

Table ES-4. Summary of Significant and Unavoidable Impacts

Potential Impact	Alternative(s)	Significance Pursuant to CEQA	Proposed Mitigation	Significance After Mitigation Pursuant to CEQA
KBRA				
Construction activities associated with the KBRA programs could result in temporary increases in air quality pollutant emissions from vehicle exhaust and fugitive dust.	2, 3	S	AQ-1: MY 2015 or newer engines for offroad construction equipment AQ-2: MY 2000 or newer engines for on-road construction equipment AQ-3: MY 2010 or newer engines for haul trucks	S ¹⁰
Operational activities associated with the Fisheries Reintroduction and Management Plan could result in temporary increases in air quality pollutant emissions from vehicle exhaust associated with trap-and-haul activities.	2, 3	S	AQ-1: MY 2015 or newer engines for offroad construction equipment AQ-2: MY 2000 or newer engines for on-road construction equipment AQ-3: MY 2010 or newer engines for haul trucks	S ⁹
3.10 Greenhouse Gases/Global Climate Change				
Removing or reducing a renewable source of power by removing the dams or developing fish passage could result in increased GHG emissions from possible non-renewable alternate sources of power.	2, 3, 4, 5	S	CC-1: Market Mechanisms); CC-2: Energy Audit Program; and CC-3: Energy Conservation Plan	S

¹⁰ While Mitigation Measures AQ-1, 2, and 3 would be implemented to reduce impacts to LTS, emissions from any construction actions completed in the same year as hydroelectric facility removal actions may not be reduced to a less than significant level. Implementation of specific plans and projects described in the KBRA will require future environmental compliance as appropriate.

Table ES-4. Summary of Significant and Unavoidable Impacts

Potential Impact	Alternative(s)	Significance Pursuant to CEQA	Proposed Mitigation	Significance After Mitigation Pursuant to CEQA
3.13 Cultural and Historic Resources				
The Proposed Action could result in direct effects/impacts to J.C. Boyle Dam, Copco 1 Dam, Copco 2 Dam, and Iron Gate Dam, their associated hydroelectric facilities, and on the KHHD, which is considered eligible for inclusion on the National Register and California Register.	2, 3, 5	S	CHR-1: Update the Klamath Hydroelectric Project Request for Determination CHR-2: MOU Under Section 106 and Preparation of Monitoring and Cultural Resources Management Plan CHR-3: Respect and Maintain Confidentiality of Sensitive Information CHR-4: Treatment of Indian Human Remains	S
KBRA				
Implementation of the KBRA programs including the Phase 1 and 2 Fisheries Restoration Plans, Fisheries Reintroduction and Management Plan, Wood River Wetland Restoration Project, On-Project Plan, Water Use Retirement Program, Fish Entrainment Reduction, Klamath Tribes Interim Fishing Site, and Mazama Forest Project could result in impacts/effects to archaeological and historic sites, TCPs, and cultural landscapes that are eligible for inclusion on the National Register and/or California Register and possibly Indian human remains.	2, 3	S	CHR-1: Update the Klamath Hydroelectric Project Request for Determination CHR-2: MOU Under Section 106 and Preparation of Monitoring and Cultural Resources Management Plan CHR-3: Respect and Maintain Confidentiality of Sensitive Information CHR-4: Treatment of Indian Human Remains	S ¹¹
3.19 Scenic Quality				
Ongoing fish habitat restoration actions could result in short-term and long-term impacts on scenic resources.	1	S (short-term from construction)	None	S (short-term from construction)
The removal of historic structures could result in impacts on scenic resources.	2, 3, 5	S	None	S

¹¹ Studies will be conducted to identify cultural resources and reduce significant impacts to these resources. Implementation of specific plans and projects associated with the KBRA will require future environmental compliance as appropriate.

Table ES-4. Summary of Significant and Unavoidable Impacts

Potential Impact	Alternative(s)	Significance Pursuant to CEQA	Proposed Mitigation	Significance After Mitigation Pursuant to CEQA
Dam removal could result in short and long-term impacts on scenic resources in formerly inundated reservoir areas.	2, 3, 5	S	None	S
Deconstruction and restoration activities could result in short-term impacts on scenic resources in the immediate vicinity of the Four Facilities.	2, 3, 5	S (short-term)	None	S (short-term)
Construction of a new, elevated City of Yreka water supply pipeline and steel pipeline bridge to support the pipe above the Klamath River could result in short and long-term impacts on scenic resources.	2, 3, 5	S (short-term)	None	S (short-term)
Replacement of the existing wooden Lakeview Bridge just downstream of Iron Gate Dam with a concrete bridge could result in short and long-term impacts on scenic resources.	2, 3	S (short-term)	None	S (short-term)
Relocation of existing recreation facilities, such as campgrounds and boat ramps, from the reservoir banks to the new river shoreline would result in short and long-term impacts on scenic resources.	2, 3	S (short-term)	None	S (short-term)
Sediment release during dam and reservoir removal could cause temporary changes in water quality and the appearance of the Klamath River in the area of the dams and downstream from Iron Gate Dam.	2, 3, 5	S	None	S
Demolition, construction, and restoration activities for the fishways could cause short-term adverse effects on the scenic vistas in the immediate vicinity of the Four Facilities.	4, 5	S	None	S
Fishways could cause substantial long-term impacts on scenic resources.	4, 5	S	None	S
Trap and Haul Operations				
Construction activities associated with fish collection facilities would introduce new features into the landscape.	4, 5	S	None	S

Table ES-4. Summary of Significant and Unavoidable Impacts

Potential Impact	Alternative(s)	Significance Pursuant to CEQA	Proposed Mitigation	Significance After Mitigation Pursuant to CEQA
KBRA				
Construction activities associated with fish collection facilities would introduce new features into the landscape.	2, 3	S	None	S
3.20 Recreation				
Changes in flows could decrease the number of days with acceptable flows for whitewater boating and fishing in the Hells Corner Reach.	2, 3, 4, 5	S (whitewater boating)	None	S (whitewater boating)
3.23 Noise and Vibration				
Construction and deconstruction activities at the dam sites could cause a temporary increase in noise levels at Copco 1 Dam that could affect residents in the area.	2, 3, 5	S	NV-1: Noise and Vibration Control Plan	S
Construction and deconstruction activities at the dam sites could cause a temporary increase in nighttime noise levels at Iron Gate Dam.	2, 3, 5	S	NV-1: Noise and Vibration Control Plan	S
Reservoir restoration activities could result in short-term increases in noise levels in the project vicinity.	2, 3, 5	S	NV-1: Noise and Vibration Control Plan	S
Blasting activities at Copco 1 Dam could increase vibration levels.	2, 3, 5	S	NV-1: Noise and Vibration Control Plan	S
Construction activities at the dam sites could increase short-term vibration levels.	2, 3, 5	S	NV-1: Noise and Vibration Control Plan	S

Key:

BLM = Bureau of Land Management

BOD = biological oxygen demand

CEQA = California Environmental Quality Act

CO = carbon monoxide

DOC = United States Department of Commerce

DOI = Department of the Interior

DRE = Dam Removal Entity

EFH = Essential Fish Habitat

FERC = Federal Energy Regulatory Commission

GHG = Greenhouse Gases

IOD = immediate oxygen demand

KBRA = Klamath Basin Restoration Agreement

KHHD = Klamath Hydroelectric Historic District

KHP = Klamath Hydroelectric Project

MSAE = Microcystis aeruginosa

NAGPRA = Native American Graves Protection and Repatriation Act

Klamath Facilities Removal EIS/EIR Public Draft

ODEQ = Oregon Department of Environmental Quality

PM₁₀ = particulate matter < 10 microns

PM_{2.5} = particulate matter < 2.5 microns

SO₂ = sulfur dioxide

SSC = suspended sediment concentrations

TN = Total Nitrogen

TP = Total Phosphorus

USFWS = United States Fish and Wildlife Service

VOC = volatile organic compounds

VRM = Visual Resource Management Methodology

WQ = Water quality

WSR = Wild and Scenic River

Significance:

NCFEC = No Change From Existing Conditions

B = Beneficial

LTS = Less than Significant

S = Significant

N/A = Not Applicable

Alternatives:

1 = No Action/No Project

2 = Full Facilities Removal of Four Dams Alternative (Proposed Action)

3 = Partial Facilities Removal of Four Dams Alternative

4 = Fish Passage at Four Dams Alternative

5 = Fish Passage at J.C. Boyle and Copco 2, Remove Copco 1 and Iron Gate Alternative

Table ES-5. Summary of Adverse Environmental Effects Relative to NEPA¹

Potential Impact	Alternative(s)	Effect Pursuant to NEPA	Mitigation
3.15 Socioeconomics			
<i>Four Facilities</i>			
Changes in annual O&M expenditures required to continue the operation of the existing facilities could affect employment, labor income, and output in the regional economy.	2, 3, 5	Adverse	None
<i>Recreation</i>			
Changes to reservoir recreation expenditures could affect employment, labor income, and output in the regional economy.	2, 3, 5	Adverse	None
Changes to whitewater boating opportunities could affect recreational expenditures and employment, labor income, and output in the regional economy.	2, 3, 4, 5	Adverse (from reduced whitewater boating expenditures in the Upper Klamath River and Hell's Corner Reach)	None
<i>PacifiCorp Hydroelectric Service</i>			
Energy rates for PacifiCorp customers could change.	1, 4, 5	Unknown ²	None
<i>Property Values and Local Government Revenues</i>			
Property values surrounding Iron Gate and Copco Reservoirs could change.	2, 3, 5 (around Copco 1 and Iron Gate Reservoirs)	Adverse (short-term); Unknown (long-term) ²	None
Changes in real estate values around Copco 1 and Iron Gate Reservoirs could affect property tax revenues to Siskiyou County.	2, 3, 5	Adverse (short-term); Unknown (long-term) ³	None
Changes in visitation for recreation activities could affect sales tax revenues.	2, 3	Unknown ⁴	None

Table ES-5. Summary of Adverse Environmental Effects Relative to NEPA¹

Potential Impact	Alternative(s)	Effect Pursuant to NEPA	Mitigation
Increases in on-farm pumping costs could affect household income and reduce employment, labor income, and output in the regional economy.	2, 3	Adverse	None
Water acquisitions via short-term water leasing could decrease farm revenues and reduce employment, labor income, and output in the regional economy.	2, 3	Adverse (short-term)	None
3.16 Environmental Justice			
Increased traffic, air quality emissions, and noise associated with construction activities could disproportionately affect county residents and tribal people.	2, 3, 4, 5	Disproportionate Effects (short-term)	AQ-1: MY 2015 or newer engines for offroad construction equipment AQ-2: MY 2000 or newer engines for on-road construction equipment AQ-3: MY 2010 or newer engines for haul trucks AQ-4: Dust control measures during blasting operations NV-1: Noise and Vibration Control Plan
Changes in county revenues could decrease county funding of social programs used by county residents.	2, 3, 5	Disproportionate Effects	None
Traffic on associated haul roads could disproportionately affect county residents and tribal people.	2, 3, 4, 5	Disproportionate Effects (short-term)	TR-1: Relocate Jenny Creek Bridge and Culverts

Table ES-5. Summary of Adverse Environmental Effects Relative to NEPA¹

Potential Impact	Alternative(s)	Effect Pursuant to NEPA	Mitigation
Implementation of the Water Use Retirement Program, Off-Project Reliance Program, and Interim Flow and Lake Level Program could disproportionately affect low income and minority farm workers.	2, 3	Disproportionate Effects (short-term)	None

KEY:**Significance:**

NCFEC = No Change From Existing Conditions

B = Beneficial

LTS = Less than Significant

S = Significant

N/A = Not Applicable

Alternatives:

1 = No Action/No Project

2 = Full Facilities Removal of Four Dams Alternative (Proposed Action)

3 = Partial Facilities Removal of Four Dams Alternative

4 = Fish Passage at Four Dams Alternative

5 = Fish Passage at J.C. Boyle and Copco 2, Remove Copco 1 and Iron Gate Alternative

Notes:

1- Effects relative to tribal trust resources are not displayed in this table given that no new adverse effects were identified relative to the alternatives analyzed in this EIS/EIR. Section 3.12, Tribal Trust of this EIS/EIR does however summarize the existing and ongoing tribal trust impacts present in the Klamath Basin.

2 - Many factors affect setting customer electricity rates, including regulatory approval; therefore, it is difficult to assess how rates may change, if at all.

3 - It is unknown how the real estate value of properties with existing reservoir views may change in the long term from river restoration activities.

4 - Changes in recreation expenditures and associated sales taxes vary by recreation activity. The net effect of changes in recreation expenditures is unknown.

ES.7.2 Balancing Impacts and Benefits of the Alternatives

Under NEPA (40 CFR Part 1502.16, Environmental Consequences), a discussion of the environmental impacts of the alternatives, including the proposed action, should be included. A discussion of the potential beneficial effects of the alternatives is also valuable for decision-makers when comparing and contrasting alternatives and determining the best course of action to be undertaken.

CEQA Guidelines require the balancing, as applicable, of the economic, legal, social, technological, or other benefits of a proposed project against its unavoidable environmental risks when determining whether to approve a project (Section 15093 (a)-(c)). If the specific benefits, including region-wide or statewide environmental benefits of a proposed project outweigh the unavoidable adverse environmental effects, the adverse environmental effects may be considered “acceptable.” When a lead agency approves a project which will result in the occurrence of significant effects which are identified, but not avoided or substantially lessened, the lead agency under CEQA shall state in writing the specific reasons to support its action based on the final EIS/EIR or other information in the record. This statement becomes the statement of overriding considerations as required under CEQA.

As illustrated throughout this Executive Summary, the dominant factors agreed upon in the KHSA and KBRA centered on improving and resolving issues of low or declining fish populations, inadequate water supplies, and degraded water quality. The primary goal of these agreements is to improve the condition of these basin resources and thereby benefit the communities who rely on them, or historically relied on them, for a way of life. This includes tribal, fishing, farming, and recreational communities throughout the Klamath Basin.

One example of the inter-relatedness of basin resources and communities can be seen by evaluating the impacts and benefits of the alternatives on environmental justice communities in the basin. Reversing the consequences of barriers to fish passage, degraded fish habitat, and degraded water quality throughout the basin could result in great benefit to tribal communities relying on fish, shellfish, riparian plants, clean water, and other resources for their subsistence, ceremonies, physical health, way of life, and spiritual well-being. While sediment release during dam removal could cause short-term (1 to 2 years) impacts on fisheries downstream of the Hydroelectric Reach, salmon and other aquatic resources would be expected to return to existing 2010 levels within 5 years, and would provide long term benefits to Indian Tribes for 50 years and beyond (these effects are analyzed in Section 3.16).

In addition to benefits to fisheries and water quality, over the period of analysis, dam removal combined with undertaking the programs in the KBRA would have beneficial effects on the following basin resources:

- **Terrestrial Resources** (analyzed in Section 3.5) through enhanced habitat connectivity and animal movement.
- **Socioeconomic Resources** (analyzed in Section 3.15) through changes in commercial, recreational, and tribal fishing harvests and refuge recreation, as well as local and

regional increases in economic output, employment, and labor income from construction and mitigation spending.

- **Scenic Quality** (analyzed in Section 3.19) through returning areas around the dams closer to the scenic quality characteristics of the natural landscape.
- **Recreation** (analyzed in Section 3.20) through improvements in water-contact-based recreation and benefits to the Wild and Scenic River Act designation of the Klamath River.

Because restoring fisheries, improving water quality, and helping communities are major goals of the Proposed Action and the alternatives, a summary of the major long-term benefits of each alternative and their impacts is summarized below relative to these goals (these are also summarized in Table ES-5). In addition, the baseline (existing) condition is summarized because it is the benchmark against which the five alternatives are compared.

Baseline

The Klamath Basin currently suffers from degraded fisheries, degraded habitat quality (including flows, water temperatures, and river channel structure), habitat limitations (barriers to fish passage), and degraded water quality (including problems with dissolved oxygen, pH, nutrient enrichment, algal growth, and algal toxins). Major water quality problems exist in Upper Klamath Lake, Keno Reservoir, and the reservoirs in the Hydroelectric Reach.

One result of these impaired water quality and habitat conditions has been fish die-offs, listings under federal and California endangered species acts, and commercial fishing closures. Circumstances for threatened and endangered species in the Klamath Basin are not improving. In addition, basin water supplies are over-allocated and do not meet all user needs; these challenges have been particularly acute in dry years. Water shortages, combined with the need to balance supplies among the needs of ESA-listed species (suckers in Upper Klamath Lake and coho salmon in the Klamath River), national wildlife refuges, and farming communities have led to the reduction of irrigation water deliveries to farmers in dry years. In short, existing conditions represent a continued hardship for fishing, farming, tribal, and recreational communities. In particular, the Klamath Tribes have had to bear the hardship of being without salmon in the Upper Basin for nearly 100 years and without harvestable sucker populations for 25 years; these species are fundamental to their diet, their ceremonies, and their cultural well-being.

Alternative 1 (No Action/No Project Alternative)

Alternative 1 (No Action/No Project Alternative) is continued operation of the Klamath hydroelectric project under an annual license issued by FERC and would result in the continuation of many of the existing conditions described under Baseline. Implementation of TMDLs in Oregon and California over the next 50 years would be expected to help alleviate some of the basin-wide water quality problems. However, the concurrent processes and effects of climate change over the next 50 years could further challenge the survival of ESA-listed fish, push more fish into ESA listing, or cause populations of certain species like Chinook or steelhead to further decline.

As the FERC relicensing process would resume following a negative determination on dam removal from the Secretary, Alternative 1 could not continue for decades as the status quo; however, over 50 years, this alternative would likely retain the majority of the existing hydroelectric power generation capacity and the reservoirs would remain in place and would continue to be used for recreational purposes (the significance of these effects is analyzed in Sections 3.18 and 3.20, respectively). The recreational value of these reservoirs, however, has been diminished in recent years (since 2005) due to the documented growth of toxic algae in Copco 1 and Iron Gate Reservoirs and health advisory postings to that effect.

Alternative 1 would not result in the short-term negative impacts related to construction activities or short-term impacts to fish from the downstream transport of sediment during reservoir drawdown.

Alternative 4 (Fish Passage at Four Dams Alternative)

Alternative 4 would result in the same benefits to water quality from TMDL implementation as Alternative 1; however the creation of volitional fish passage for salmon at each of the Four Facilities under this alternative would open Upper Basin habitat to anadromous fish.

Consequently, the size and diversity of these populations would increase. Implementation of Alternative 4 and access to Upper Basin habitat would decrease crowding of adult salmon and reduce the prevalence of disease for juvenile salmon. In addition, fish would gain access to thermal refuge areas, particularly in the Upper Basin, offering some protection against the future changes associated with climate change.

Alternative 4 would retain the majority of hydroelectric power generation capacity and project reservoirs would remain in place and would continue to be used for recreational purposes (the significance of these effects is analyzed in Sections 3.18 and 3.20, respectively). Alternative 4 would not result in short-term impacts to fish from downstream transport of sediment during reservoir drawdown.

Alternative 5 (Fish Passage at J.C. Boyle and Copco 2, Remove Copco 1 and Iron Gate)

Alternative 5 would result in the same benefits as Alternative 4 for anadromous fish; however, removal of Copco 1 and Iron Gate Dams would provide additional benefits. Fish would be able to migrate upstream and downstream more efficiently through a greater length of natural river channel and through fewer constructed fish passage facilities in order to use habitat in the Upper Basin. By removing the two largest reservoirs in the Hydroelectric Reach, many of the water quality impairments caused by impounding water, including high pH, elevated fall water temperatures, low dissolved oxygen, and the presence of algal toxins, would be eliminated within and below the Hydroelectric Reach. Alternative 5 would also eliminate peaking and stranding in the Hydroelectric Reach, which currently has adverse effects on biological communities.

While water quality problems would improve as a result of draining Copco and Iron Gate Reservoirs, Alternative 5 would also eliminate recreational uses of these reservoirs and could decrease the value of property with access to, or views of, the reservoirs, at least in the short term. Decreased recreational opportunities could have related effects on other resources analyzed in this EIS/EIR (i.e., Socioeconomics and Recreation, analyzed in detail in Sections 3.15 and 3.20, respectively).

Removal of Copco 1 and Iron Gate Dams would significantly decrease the amount of hydroelectric power generated by the Klamath Hydroelectric Project.

Alternatives 2 and 3

Alternatives 2 and 3 would have the benefits of Alternative 5 for anadromous fish; however, Alternatives 2 and 3 would provide additional fisheries and water quality benefits. Removing all Four Facilities would provide for a free-flowing river and would optimize the efficiency of fish migration to and from the Upper Basin as well as through the entire Hydroelectric Reach. The entire river from Keno Dam to the Pacific Ocean would become a well-connected, free-flowing river and would provide new fish habitat in the Hydroelectric Reach. Dam removal would maximize the recruitment of gravel within and below the Hydroelectric Reach, which would benefit fish spawning. Additionally, Alternatives 2 and 3 would create a more natural flow pattern and a more mobile stream bed. Both of these conditions are anticipated to reduce the occurrence of juvenile salmon fish disease and would likely create better conditions for fish migration, rearing, and spawning.

Implementation of KBRA projects and programs under Alternatives 2 and 3 would achieve faster basin-wide habitat restoration for fish, faster basin-wide water quality improvements, and direct support for improving water quality in Upper Klamath Lake and Keno Reach, which would benefit migrating salmon and steelhead populations and resident sucker populations in Upper Klamath Lake. The KBRA Fisheries Reintroduction and Management Plans could have direct benefits for salmon by accelerating their reintroduction to the Upper Basin and by providing for fish population monitoring to optimize adaptive management of restoration activities.

This alternative would eliminate the recreational benefits of project reservoirs and could decrease the value of properties with access to, or views of the reservoirs, at least in the short term; however, full facilities removal would create new recreational benefits along the Hydroelectric Reach (the significance of these effects is analyzed in Section 3.20). Finally, Alternatives 2 and 3 would eliminate all of the hydroelectric power generation from the Four Facilities (the significance of these effects is analyzed in Section 3.18).

Comparing Alternatives 2 and 3

There are many similarities in the benefits and potential impacts of Alternatives 2 and 3. The main difference between the alternatives is that Alternative 3 would leave some facilities in place, but both alternatives would create a free-flowing river and eliminate any passage barriers to fish from Keno Dam to the Pacific Ocean.

Given the fact that fewer structures would be removed under Alternative 3 compared to Alternative 2, there would be fewer short-term environmental impacts associated with construction activities and the use of heavy equipment. Thus, impacts related to the release of greenhouse gases, noise, and ground and land disturbance would be diminished and there would be less likelihood of displacing cultural resources or human remains (impacts to Cultural Resources are analyzed in Section 3.13). However, leaving various appurtenant power generation facilities in place has the potential to interfere with wildlife movement and aesthetic quality, and would require some level of long-term maintenance.

Table ES-6 below summarizes the expected major benefits to salmonids and water quality for all five alternatives in this EIS/EIR as compared to existing (baseline) conditions.

Table ES-6. Summary of Major Long-Term Benefits for Salmonid Restoration and Water Quality

Major long-term benefits of alternatives for water quality and salmonids as compared to existing conditions (baseline)	Alternative 1	Alternatives 2 and 3	Alternative 4	Alternative 5
Water Quality Benefits				
River no longer exceeds OR and CA water temperature, nutrient, dissolved oxygen, pH, and chlorophyll-a TMDL allocations (may not occur by 2062), improving water quality basin wide	X ¹	X	X	X
Accelerates when river no longer exceeds OR and CA water temperature, nutrient, dissolved oxygen, pH, and chlorophyll-a TMDL allocations through the KBRA Fisheries Restoration Plan, improving water quality basin wide		X		
Largely eliminates in 2020 elevated late summer/fall water temperatures in and below the Hydroelectric Reach by removing the largest reservoirs		X		X
Largely eliminates 2020 dissolved oxygen and pH problems produced in reservoirs in the Hydroelectric Reach and transported downstream		X		X
Largely eliminates in 2020 algal toxins produced in the Hydroelectric Reach and transported downstream ³		X		X
Salmonid Benefits				
Provides slightly cooler water temperatures in spring and early summer benefiting migration of both adult and juvenile salmonids	X		X	
Provides fish with access to thermal refuge areas that are buffered from future effects from climate change		X	X	X
Provides for natural recruitment of spawning gravel and river processes within and below the Hydroelectric Reach through dam removal		X		Partial ²
Expands access to salmonid habitat to the Upper Basin (above J.C. Boyle Reservoir)		X	X	X
Expands salmonid habitat to a "free-flowing" hydroelectric reach		X		Partial
Accelerates in 2012 restoration of fish habitat throughout the basin through the KBRA Fisheries Restoration Plan		X		

Table ES-6. Summary of Major Long-Term Benefits for Salmonid Restoration and Water Quality

Major long-term benefits of alternatives for water quality and salmonids as compared to existing conditions (baseline)	Alternative 1	Alternatives 2 and 3	Alternative 4	Alternative 5
Expands opportunity to create springtime flushing flows (KBRA Environmental Water Program) and to increase flow variability and bed movement (with dam removal), which are hypothesized to reduce juvenile salmon disease below the Hydroelectric Reach		X		Partial
Provides opportunity to reduce juvenile salmon disease by allowing volitional fish passage through the Hydroelectric Reach and decreasing crowding of adult salmon		X	X	X
Provides volitional fish passage through the Hydroelectric Reach		X	X	X
Provides optimal efficiency beginning in 2020 of upstream and downstream salmonid migration through the Hydroelectric Reach by creating a free-flowing river		X		
Accelerates the effective use of the Upper Basin by salmonids through the KBRA Fisheries Reintroduction and Management Plan		X		
Improves base flows for salmonids, particularly in drought years, through KBRA Water Resources Program		X		
Eliminates adverse effects of hydroelectric peaking and stranding of fish in the Hydroelectric Reach		X		X

Notes:

¹ "X" means the alternative provides this benefit.² "Partial" means the alternative provides only some of the benefit.³ Increased periphyton biomass would not affect levels of algal toxins in the Klamath River. The noxious blooms of phytoplankton (suspended algae) occurring in the calm, lake-like waters of Copco 1 and Iron Gate Reservoirs are responsible for the production of algal toxins, such as microcystin, in the Klamath River downstream of Iron Gate Dam (see Section 3.4). Noxious phytoplankton would not thrive in the free-flowing river following dam removal.**ES.7.3 Environmentally Preferable/Superior Alternative**

NEPA requires the Lead Agency to identify the alternative or alternatives that are environmentally preferable in the Record of Decision (ROD) (40 CFR Part 1505.2(b)). The environmentally preferable alternative generally refers to the alternative that would result in the fewest adverse effects to the biological and physical environment. It is also the alternative that would best protect, preserve, and enhance historic, cultural, and natural resources. Although this alternative must be identified in the ROD, it need not be selected for implementation.

Section 15126.6(e)(2) of the CEQA Guidelines requires agencies to identify the environmentally superior alternative in a draft EIR. If the No Project Alternative is the environmentally superior alternative, an additional environmentally superior alternative must be identified among the other alternatives.

CDFG has identified Alternative 3 (Partial Facilities Removal of Four Dams) as the environmentally superior alternative. All of the alternatives evaluated in the EIS/EIR, including for the No Action/No Project Alternative, have significant unavoidable environmental impacts as identified in Section 5.5. Alternative 2 (Full Facilities Removal of Four Dams, the Proposed Action), Alternative 3, and Alternative 5 (Fish Passage at J.C. Boyle and Copco 2, Remove Copco 1 and Iron Gate) would have the most short-term significant and unavoidable impacts among the alternatives. These impacts would largely be limited to the time frame of direct dam deconstruction actions and sediment release. After dam deconstruction, impacts would include the loss of reservoir recreation and local economic impacts. Alternatives 2, 3, and 5 would significantly improve water temperature, dissolved oxygen, and algal toxins for aquatic resources and reduce the incidence of fish disease in juvenile salmon by removing the two largest reservoirs—Copco I and Iron Gate. Alternatives 4 and 5 would maintain some power production and recreational benefits thereby reducing local economic impacts.

Although the No Action/No Project Alternative will have no change from existing conditions resulting from construction, this alternative is not the environmentally superior alternative when compared to the Proposed Action, which is intended to improve environmental conditions. Alternative 3 is the environmentally superior alternative when compared with the Proposed Action because it would:

- Reduce the air quality impacts from emissions of volatile organic compounds (VOCs), nitrogen oxides (NO_x), carbon monoxide (CO), sulfur dioxide (SO₂), particulate matter < 10 microns (PM₁₀), and particulate matter < 2.5 microns (PM_{2.5}) from reduced construction activities;
- Reduce the contribution to greenhouse gas emissions from reduced construction activities;
- Reduce noise and vibration from reduced construction activities;
- Reduce impacts to terrestrial plants and wildlife from fewer truck trips;
- Reduce disturbance to archaeological and historic sites from fewer truck trips;
- Retain structures for roosting bats; and
- Retain historically significant structures at Copco 1.

Alternative 3 would provide similar long-term benefits when compared with Alternative 2, but would reduce short-term impacts because it involves less construction. Alternative 3 would result in superior long-term beneficial environmental effects. In summary, Alternative 3 is considered the environmentally superior alternative among all the alternatives because it provides long-term beneficial environmental effects, while reducing some of the short-term significant effects of the Proposed Action (Alternative 2).

ES.7.4 Controversies and Issues Raised by Agencies and the Public

CEQA requires disclosure of the controversial project issues raised by agencies and the public. Table ES-6 presents a summary of some of the controversial project issues identified during the scoping period, which are addressed in this EIS/EIR. These are opinions and issues raised during scoping by agencies and members of the public and do not necessarily represent the position of the Lead Agencies. Additionally, Table ES-7 is not a summary of findings or determinations

from the analysis in this EIS/EIR. Chapter 5 of this EIS/EIR, *Other Required Disclosures*, presents the full list of controversial project issues and the timeline or process in which they will be addressed, or the document in which they are addressed. See the Scoping Report (located online at: <http://klamathrestoration.gov/>) for further information on issues identified by agencies and the public during the public scoping process.

Table ES-7. Summary of Controversies and Issues Raised by Agencies and the Public¹

Issue	Summary of Issue	Timeline for Addressing or Document/Section Addressing Issue
Loss of Renewable Power Supply	Loss of the Klamath Hydroelectric Project will result in the loss of renewable power. The specific makeup of new power supplies is not certain and may come from non-renewable sources.	Greenhouse Gases/Global Climate Change (Section 3.10.4.3) Public Health and Safety, Utilities and Public Services, Solid Waste, Power (Section 3.18.4.3)
Regional Economic Impacts	Loss of the Klamath Hydroelectric Project and lost power generation will negatively and disproportionately affect resource-based economies of local communities, many of which are struggling economically.	Socioeconomics (Section 3.15.4.3)
Sediment Impacts from Dam Removal	Sediment release during dam removal will have significant and deleterious effects on the aquatic environment from Iron Gate Dam to the Pacific Ocean during the period of dam removal.	Water Quality (Section 3.2.4.3) Aquatic Resources (Section 3.3.4.3)
Historic Anadromous Fish Distribution in the Upper Klamath Basin	Dam removal would open large areas of the Upper Klamath Basin watershed to anadromous fish. The historical distribution of anadromous fish above the dams has been questioned.	Chapter 1, Introduction Aquatic Resources (Section 3.3.4.3)
KBRA Effects	The KBRA may not produce enough social and economic benefits from implementation.	Socioeconomics (Section 3.15.4.3)
Loss of Reservoir Environment	Dam removal will result in a loss of the three largest reservoirs, affecting individuals that live on or near the reservoirs and who value the reservoirs' aesthetic and recreational value.	Land Use, Agricultural, and Forest Resources (Section 3.14.4.3) Scenic Quality (Section 3.19.4.3) Recreation (Section 3.20.4.3)
Flood Risk	Dam removal will increase the incidence and magnitude of flooding to downstream communities.	Flood Hydrology (Section 3.6.4.3)

Table ES-7. Summary of Controversies and Issues Raised by Agencies and the Public¹

Issue	Summary of Issue	Timeline for Addressing or Document/Section Addressing Issue
FERC Relicensing	In the event of a negative Secretarial Determination, PacifiCorp would re-enter the FERC relicensing process. The outcome of this process is not known but could be the continued operation of the dams under a new license that includes the agencies' mandatory conditions and prescriptions.	Chapter 2, Proposed Action and Description of Alternatives
Agriculture and Refuge Management contributes to poor water quality in Keno and Upper Klamath Lake	Runoff from agriculture and refuges results in poor water quality in Keno Reservoir and in the mainstem Klamath River. This causes fish stress, disease and mortality. Continued farming and ranching in the Tule Lake National Wildlife Refuge and Lower Klamath Lake National Wildlife Refuge under the KBRA would inhibit fish species reintroduction and survival.	Water Quality (Section 3.2.4.3) Aquatic Resources (Section 3.3.4.3)
Water Quality Conditions in Keno Impoundment and Upper Klamath Lake would not allow sound fish passage	Low levels of dissolved oxygen and high water temperatures during certain times of year would prohibit passage of fish through Keno Impoundment and Upper Klamath Lake.	Water Quality (Section 3.2.4.3) Aquatic Resources (Section 3.3.4.3)

Notes:

¹ CEQA requires disclosure of the controversial project issues raised by agencies and the public. Table ES-7 presents a summary of some of the controversial project issues identified during the scoping period, which are addressed in this EIS/EIR. These are opinions and issues raised during scoping by agencies and members of the public and do not necessarily represent the position of the Lead Agencies. Additionally Table ES-7 is not a summary of findings or determinations from the analysis in this EIS/R.

ES.8 References

Department of Interior and National Oceanic and Atmospheric Administration Fisheries Services. 2007. United States Department of the Interior and National Marine Fisheries Service Modified Prescriptions for Fishways and Alternatives Analysis Pursuant to Section 18 and Section 33 of the Federal Power Act for the Klamath Hydroelectric Project (FERC Project No. 2082). January 26, 2007.

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Oregon Public Utilities Commission, 2010. In the Matter of PacifiCorp, dba Pacific Power. Application to Implement the Provisions of Senate Bill 76. Order No. 10-364. September 16, 2010.

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